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Difference In Distance Interpupillary Distance Between Different Age Group Of Different Malaysian Races Within Seksyen 13, Shah Alam.

Subhadeep Das, Kartiga Sandira Segaran, Mousumi Dutta.

Faculty of Health and Life Sciences

Department of Optometry and Vision Science

Management and Science University

Correspondence Author: Subhadeep Das, Faculty of Health and Life Sciences, Department of Optometry and Vision Science, Management and Science University

E-Mail Id: Subhadeep.das1987@gmail.com

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Abstract

Interpupillary distance (IPD) is the measurement of distance between the centers of the pupils of the two eyes measured in millimetres. It's an important factor in all aspects of our binocular vision. Measurement of interpupillary distance is used to properly align the center of spectacle lenses with the center of our eyes. The purpose of this research was to find differences in distance interpupillary distance (IPD) based on age group and Malaysian races within Seksyen 13, Shah Alam. A cross-sectional study was done on 60 subjects. A two-way ANOVA analysis of variance was conducted to find the differences in distance interpupillary distance (IPD) based on age group of different Malaysian races within Seksyen 13, Shah Alam. The results for the two- way ANOVA showed no significant main effect with age, $p > 0.005$ (0.568) and a significant main effect for different Malaysian race with $p<0.05$ (0.016). The descriptive statistics shows that the mean score for Indian race (M= 61.714, SD= 1.6091), Malay race (M= 61.143, SD= 1.2956) and Chinese race was (M= 60.429, SD= 1.2378). While, the results showed no significant interaction between age and race, $p>0.05$ (0.322), indicating that no differences between the interpupillary distance value based on age group of different Malaysian races. In conclusion, study had shown a no significantly differences in IPD based on both the age group and Malaysian races but showed statistically significant difference of IPD based on Malaysian races.

Keywords: IPD, Malaysian Races, Age Group

Introduction:

Interpupillary distance (IPD) is the measurement of distance between the centers of the pupils of the two eyes in millimeters and an important factor in all aspects of our binocular vision. Interpupillary distance is important for binocular viewing systems, where pupil of both eyes needs to be positioned within the exit pupils of the viewing system. Interpupillary distance determines the degree of retinal image disparity in fellow eyes which are combined in the brain to produce stereo perception (Fesharaki et al., 2012). If the centers of spectacle lenses are not aligned properly, then the patient may experience unwanted prismatic effect which may leads to eyestrain, headaches, distorted vision, double vision, blurred vision and incompliance to spectacle wear. Thus, positioning of spectacle lenses correctly in relation to the centre of the pupils is especially important for higher powered lenses due to the location of the optical centre of the lenses.

According to online handbook of optical systems vol.4 by Herbertt Gross (2008), the typical interpupillary distance for adults is around 54 to 68 mm, while measurements generally will fall between 48 and 73 mm.

Methods

Study Design

The objective was to determine the differences of interpupillary distance between different age group of different Malaysian races within Seksyen 13, Shah Alam.

Collecting Data (Area of Selection)

This study was a cross sectional study. Sixty three people aged from 20 to 50 years old, Malaysian races (Malay, Indian and Chinese) within Seksyen 13, Shah Alam from both gender was selected to measure their distance interpupillary distance (IPD) by using stratified sampling method.

Results

The results for the two- way ANOVA showed no significant main effect for age, $p > 0.05$ and a significant main effect for race, $p < 0.05$. The total mean IPD for Indian race was 61.714 with standard deviation of 1.6091, total mean IPD for Malay race was 61.143 with standard deviation of 1.2956 and for Chinese race the total mean IPD was 60.429 with standard deviation of 1.2378. The mean IPD value for Indian race shows the highest IPD value when compared with other races and followed by Malay and Chinese race. While, the results showed no significant interaction between age and race, $p > 0.05$ indicating that no differences between the interpupillary distance value based on age group of different Malaysian races.

Table 1: Dependent Variable: Interpupillary Distance Value

AGE	RACE	MEAN	STD.DEVIATION	N
20-30	M	60.429	1.2051	7
	I	61.643	2.1740	7
	C	60.429	1.0177	7
	TOTAL	60.833	1.5838	21
31-40	M	62.000	1.3229	7
	I	61.429	1.4840	7
	C	60.143	1.5469	7
	TOTAL	61.190	1.5928	21
41-50	M	61.000	.9574	7
	I	62.071	1.2051	7
	C	60.714	1.2199	7
	TOTAL	61.262	1.2310	21
TOTAL	M	61.143	1.2956	21
	I	61.714	1.6091	21
	C	60.429	1.2378	21
	TOTAL	61.095	1.4670	63

Table 2

Source	P- Value
Age	.568
Race	.016
Age x Race	.082

Table 3

Racial Group	Head Breadth (in mm)	
	Male	Female
Indian	145	135
Swiss	150	140
French	150	140
British	155	145
Swedish	155	145
German	155	145
American	155	145
Japanese	155	150
Polish	155	150
Hong Kong Chinese	160	150

Discussion

Similar to previous researcher, we found that there was a similarity in differences of interpupillary distance among different Malaysian races within Seksyen 13, Shah Alam. According to a study by Dodgson, N. A. (2011, May) a total of 3982 samples found that there was significant differences between certain races (white, black, hispanic, Asian/ Pacific Islander, American Indian and other) and for more evidence for difference between races they provides statistics on median head breadth which showing that there is variation between racial groups causes difference in IPD value between different races. As shown in table 3, head breadth is obviously closely related to IPD.

But, in a previous study by (ST, A. J., & WC, A. J. (2010)) found that in all three races (Malay, Indian and Chinese) a total of 300 samples consisting of 50 adult males and 50 adult females of each ethnic found that there was no significant difference between the mean IPD values among the three ethnics. However, highly statistically difference (independent t-test < 0.001) was seen when comparing between the two sexes; males had a wider IPD than females in all races.

According to Dodgson, N. A. (2011, May) in his same study he found that the mean IPD increases slightly with age, at least between 20 and 40 years old. T-test was conducted by comparing the age groups at 20, 30 and 40 years old against every age group. This shows that there is some statistical evidence that IPD continues to increase in adulthood, although the increase is small.

While, based on study by Filipovic T. (2011) 300 healthy randomized subjects aged 5 to 60 years were tested for the assessment of IPD. The mean value of IPD showed a significant increase from 5 years old to adults over 20 years old. While, in adulthood IPD remains the same. It is evident that the absolute value of IPD increases with age, at least until the third decade of life.

Besides that, in this study we had proved that there was no statistically significant differences in IPD value based on age group but there was statistically significant difference in IPD value among different Malaysian races. While, there was no statistically significant difference in IPD value between age group and Malaysian races.

The differences of results that were found in our study with previous study could be due to the difference in methodology; the methods or instrument that used to measure IPD were different compare to the previous study. For the current study we Another significant difference between previous study and the current study was the range of ages. The subjects age for current study was ranged from 20 years old to 50 years old while the subjects for previous study was ranged from 5 years old to 20 years old. This factor could cause the difference in IPD value which increases with age (Dodgson, N. A. 2011, May).

Conclusion

This study showed statistically and clinically significant differences in values in values of IPD of different Malaysian races. But this study also showed only clinically significant difference in IPD values of Malaysian races based on age but the difference in values were not statistically significant.

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